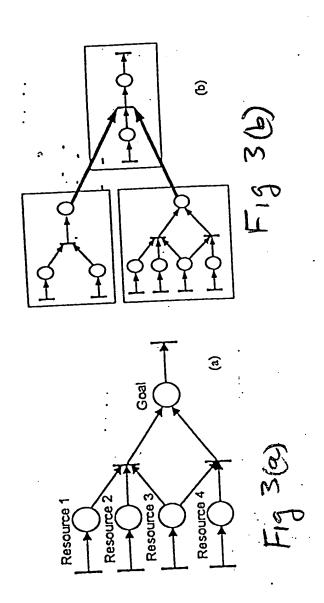
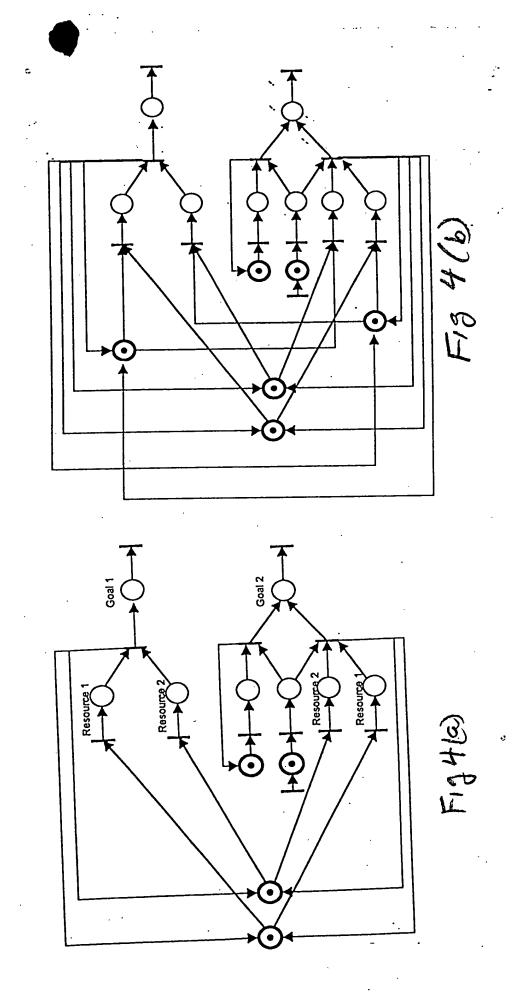


Fig 2





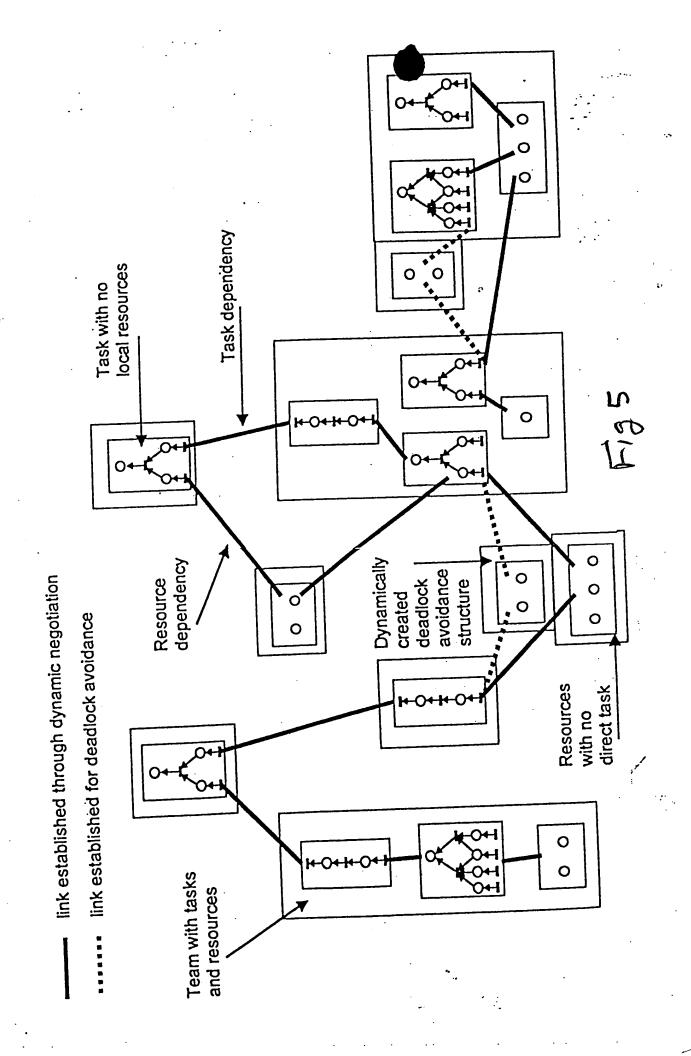


Fig. 6 Network of central authority and agent machines

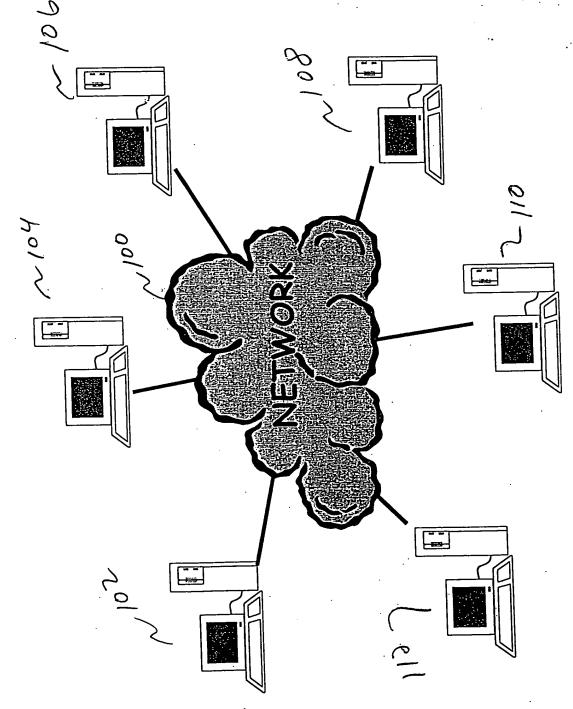
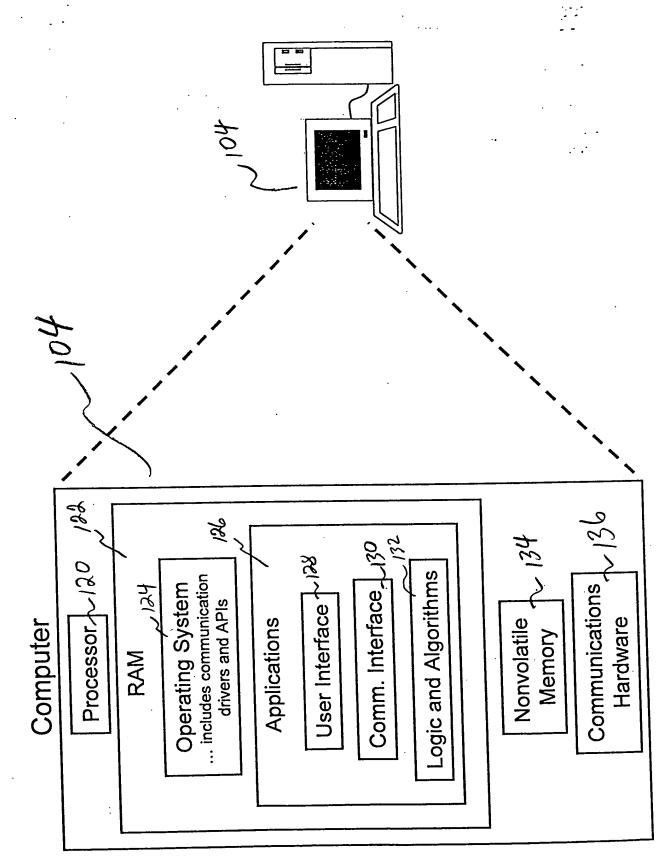


Fig. 7 Platform hardware



 Task and resource mappings Revised task and resource Resource Usage Cost and Task Completion Reward gent Initial Conditions Fig. 8 Strategic Layer / Central Authority - Inputs and Outputs Number and type of PN initial conditions 491 User feedback らな PN structure mappings resources 160 G I **Authority** CA CA Central Ш $\mathbf{\omega}$ Petri net (PN) task components Location of task implementers Completed tasks with relative Dynamic updates from agents components and PN modules Modular task representations Number and types of task Mapping between task Local connections and Ñ. Remaining resources Location of resources Number and types of Linear inequalities Mission constraints Mission objectives Initial conditions value assigned dependencies Task status capabilities resources

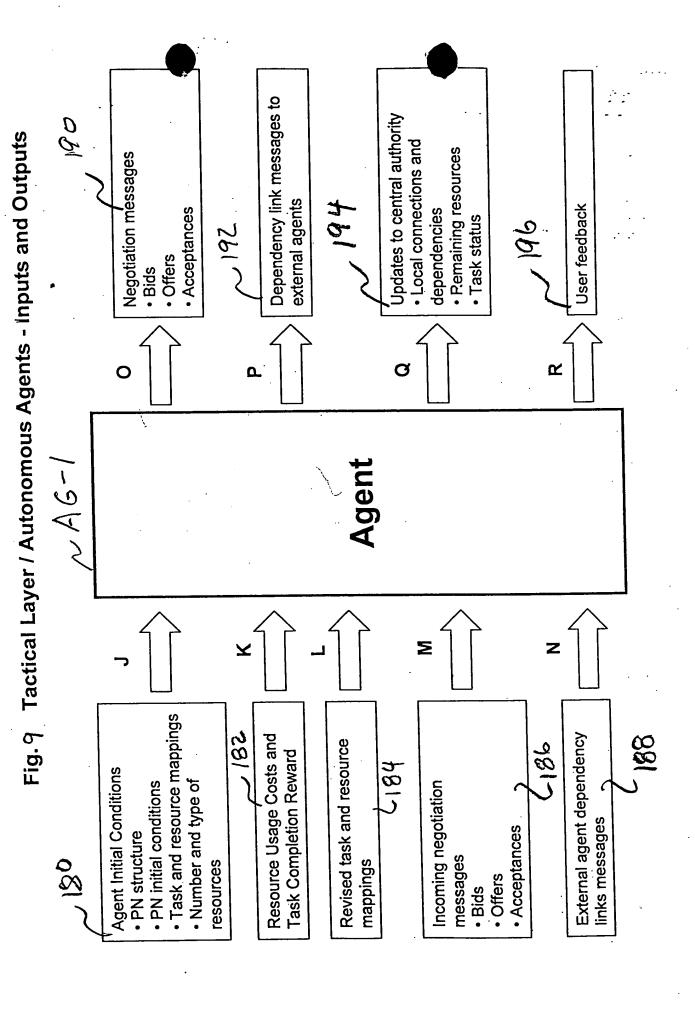
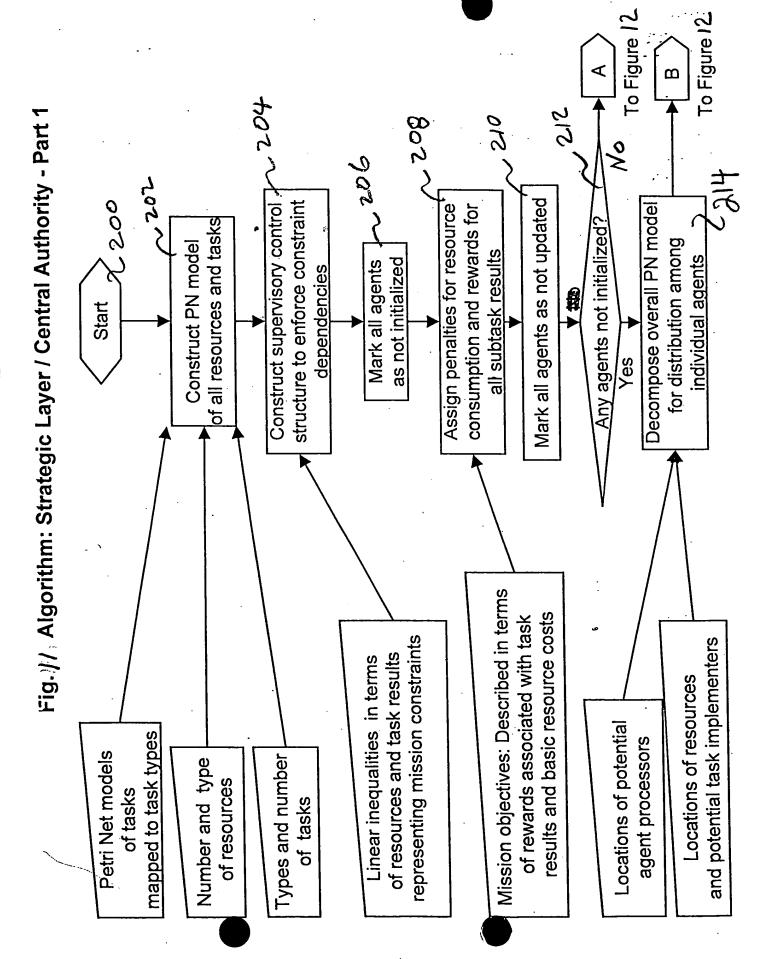


Fig. /o Interconnections of Central Authority and Autonomous Agents م Q 0 Agent n A6-26 ,AG-1 Agent 1 ග I ட **Authority** Central CA ш



For a non-initialized agent, send its the number and type of resources Fig. /2 Algorithm: Strategic Layer / Central Authority - Part 2 PN structure and initial conditions, task and resource mappings, and For a non-updated agent, send resource usage cost and task completion reward <u>ತ್</u>ದ e e e 5667 230 Mark agent updated Mark agent initialized Done 2 386, 228 Yes Yes Yes Receive incoming agent messages, if any not initialized? Any agents. Provide user complete? updated Any nonagents? feedback Mission g g From Figure 1/1 From Figure /, മ

the "I" the I"Delle A" the I"D

From Figure 14 To Figure 14 $\mathbf{\omega}$ Fig. 13 Algorithm: Tactical Layer / Autonomous Agents - Part 1 2 2 ž Yes Yes avoidance structures Calculate deadlock Setup internal PN dependency links link messages? Outgoing agent representation data received? Initialization received? Cost data Incoming Start 305 5127 304 PN structure, PN initial conditions, Number and type of resources Task and resource mappings, Setup from central authority: resource usage cost and task Update from central authority: completion reward dependency links Incoming agent

